[0096] The processing circuitry **32** may be any type of processing circuitry. For example, the processing circuitry **32** may be a programmable processor that interprets computer program instructions **34** and processes data. The processing circuitry **32** may include plural programmable processors. Alternatively, the processing circuitry **32** may be, for example, programmable hardware with embedded firmware. The processing circuitry **32** may be a single integrated circuit or a set of integrated circuits (i.e. a chipset). The processing circuitry **32** may also be a hardwired, application-specific integrated circuit (ASIC). The processing circuitry may be termed processing means.

[0097] The processing circuitry **32** is connected to write to and read from the storage device **33**. The storage device **33** may be a single memory unit or a plurality of memory units.

[0098] The demodulator **26** is configured to demodulate data modulated onto signals received by the antenna elements **32**A, **32**B, **32**C and extract therefrom an identifier relating to a mobile device that transmitted the received signals. This identifier is provided to the controller **31**.

[0099] The controller **31** operates to control the switch **19** to connect the antenna elements **32**A, **32**B, **32**C to the amplifier **21** in turn. The controller **31** controls the switch **19** to connect one of the antenna elements **32**A, **32**B, **32**C to the amplifier for the duration of transmission of the header of a packet transmitted by the mobile device **10**. After the header has been received, the controller **31** controls the switch **19** to connect different one of the antenna elements **32**A, **32**B, **32**C to the LISA **21** in a sequence. The interval between successive switching of the switch **19** is approximately equal to the symbol rate used in the payload of the transmitted packets.

[0100] The signal strength measurement module **28** is configured to determine a measure of the strength of the received signals, as provided by the output of the sampler **25**. The controller **31** is configured to receive an output of the signal strength measurement module **28**.

[0101] The controller **31** is configured to determine whether a predetermined criterion is met, and to form a message including the I and Q samples depending on the outcome of the determination. Determining whether a predetermined criterion is met is explained in more detail below. Briefly, though, the controller **31** is configured to determine whether the identifier is included in an allow list **35**A, that is stored in the storage/memory **33**. If the identifier is determined to be present in the allow list, the controller **31** determines whether the measure of signal strength meets a criterion with respect to a parameter that is included in a record in the allow list associated with the identifier. In the event of a positive determination, the message former **27** is controller to form a message including the I and Q samples and the identifier and to transmit the message to a server **48** (described below). In the event of a negative determination, the controller **31** discards the I and Q samples without the message former **27** including them in a message. If the controller **31** determines that the identifier is not included in the allow list **35**A, the message former **27** is controlled to form a message including the I and Q samples for transmission to the server **48** regardless of whether a test to determine whether signal strength measure meets the predetermined criterion is performed. The controller **31** is configured also to determine whether the received identifier is included in a deny list **35**D, that is stored in the storage/memory **33**. If the identifier is included in the deny list **35**D, the controller **31** discards the I and Q samples without the message former **27** including them in a message. In the above, comparison of the signal strength measure to a value that corresponds to the identifier is performed only if the identifier is included in the allow list. In other embodiments, allow lists and deny lists are not used.

[0102] When so controlled by the controller **31**, the message former **27** generates a message comprising I and Q samples of the downconverted signals from each of the antenna elements **32**A, **32**B, **32**C and the identifier. The message is then passed to a communications interface **29**. The communications interface **29** may include one or more of the antenna elements **32**A, **32**B, **32**C.

[0103] The message may include plural packets, each including a header and a payload. The headers of the packets include an identifier relating to and identifying the base station **30**, and the address of the server **48**. The payloads include the I and Q samples and the identifier demodulated from the signals received by the base station **30**. The payloads may also include the signal strength measure provided by the signal strength measurement module **28**. The I and Q samples and identifier relating to one signal received at the base station **30** may be included in one packet, or split across multiple packets. One packet may include I and Q samples and identifiers relating to two or more signals received at the base station **30**, although advantageously each packet relates to only one signal. In the following, the one or more packets relating to one beacon signal received from a mobile device is referred to as a positioning packet. Where this includes plural physical packets, the reconstructed message is termed the positioning packet, although it may at this stage be absent of a header.

[0104] In a prototype system constructed by the inventors, sixteen antenna elements **32**A are used. In this system, each antenna element is sampled twice although one antenna element (a reference element) is sampled more frequently. Performing three measurements results in 104 samples which, with one byte for each I and Q sample, totals 208 bytes of data. These bytes are included in the message.

[0105] The I and Q samples constitute complex signal parameters in that the I and Q samples together define parameters of a complex signal.

[0106] Instead of transmitting 'raw' I and Q samples, the controller **31** may process the I and Q samples to provide other complex signal parameters relating to the received signals, from which bearing calculation can be performed. For instance, the controller **31** may provide averaging of the I and Q samples in the angle/phase domain before converting the averages back to the I and Q domain (one sample for each antenna) and providing the averaged samples as complex signal parameters. Alternatively, the controller **31** may calculate amplitude and/or phase information from the I and Q samples, and provide the amplitude, phase or phase and amplitude information as complex signal parameters

[0107] Whatever form is taken by the complex signal parameters, they are included in a message as described above.

[0108] The message is transmitted to the server, for instance using radio signals. The radio signals may have a transmission range of 100 meters or less. For example, the radio frequency signals may be 802.11 wireless local area network (WLAN) signals, Bluetooth or Bluetooth Low Energy signals, Ultra wideband (UWB) signals or Zigbee signals.

[0109] FIG. **3** is a schematic diagram illustrating a system **37** including the base station **30** and the mobile device **10**. The base station **30** is a first base station in a plurality of base